CONTENTS

The full versions of all papers are available on the enclosed CD.

KEYNOTE PAPERS

Trends in machine tool design and use/Prof. Zäh 4

Latest developments on high speed cutting machines: improvements of accuracy, speed and enlargement of area of application/Dr. Gossel 5

High Performance Machining of Aerospace Parts/Prof. He 6

Improvement of die casting life time by machine hammer peening/Prof. Bleicher 7

Session 1: Machine tool and workpiece modelling/chairman: Prof. Zäh

14061 Stiffness improvements in complex portable machine structures by means of topology optimization 8

14089 The modelling of liquid cooling for the efficient reduction of thermal errors in heavy duty machine tools 9

14092 Simulation model for quick predictions of workpiece dynamic response in machining 10

14052 Prediction of the spindle and tool receptance: Industrial application in reaming process 11

Session 2: Machining modelling/Prof. Özel

14019 Coupled eulerian-lagrangian modelling of high speed metal cutting processes 12

14020 Finite element modeling of the orthogonal machining of particle reinforced aluminum based metal matrix composites 13

14079 Workpiece temperature modelling in CGI drilling process in dry condition 14

14081 Machining modeling, using SPH methodology 15

Session 3: Chatter modeling and suppresion/chairman: Prof. Bleicher

14078 Investigation of hexapod robot dynamics and its effects in milling 16

14044 Chatter suppression in a high speed magnetic spindle by adding damping 17

14050 A method of identification of complex cutting forces acting in unstable cutting process 18

Session 4: High speed machining/chairman: Prof. Abele

14029 High speed machining of profiled grooves in nickel-based alloys 19

14076 Analysis and measurement of cutting temperature in high speed machining of aluminum alloy 20

14071 High speed gear hobbing with cemented carbide hobs 21

Session 5: Chatter modeling and suppresion/chairman: Dr. Muñoa

14012 Analytical time-domain model for tool point dynamics in turning 22

14034 Optimal control laws for chatter suppression using inertial actuator in milling processes 23

14013 Integration of machining mechanistic models into CAM software 24

Session 6: Cutting tool design/chairman: Prof. D'Acunto

14053 Derivation of recommendations for the manufacturing of high-speed reaming tools 25

14084 Cutting tool development for effective milling of Ti6Al4V 26

14090 Material specific cutting edge geometries for machining processes 27

Session 7: Cutting fluids/chairman: Dr. Zeman

14011 Turbine blade machining by use of carbon dioxide as cryogenics 28

14035 The influence of high-pressure lubricoolant supply variant on cutting performance in turning of 42CrMo4+QT 29

14065 An experimental investigation of friction and cutting mechanics under the MQL and MQL+CO2 conditions 30

14080 Evaluation of carbide tool performanced under conventional coolant and alternative minimal quantity lubrication in high speed turning Ti-6Al-4V ELI 31

Session 8: Micromachinig/chairman: Prof. He

14031 Experimental investigation in micro-ball-end milling of hardened steel 32

14033 Investigation on micromilling of EBM Ti6Al4V titanium alloy 33

14045 Study of elementary micro-cutting in hardened tool steel 34

14051 Study of burr formation and phase transformation during micro-milling of NiTi alloys 35

Session 9: Tool path planning/chairman: Dr. Sulitka

14039 2D tool-path generation method for multi-axis milling machine using TOF camera 36
14041 Parameters set-up for collision avoidance and smooth motion in 5-axis end milling based on a potential field approach 37
14042 Feedrate optimization in 5-axis machining based on direct trajectory interpolation on the surface using an open CNC 38
14085 A new algorithm for smooth and efficient morphing-based planar tool path generation 39

Session 10: Machining analysis & optimization/chairman: Prof. Niesłony

14016 Wear study and performance evaluation in the machining of MMC with PCD and PCDN tools 40
14017 Comparison of machining inconel 718 with conventional and sustainable coolant 41
14073 Characterization of the cutting phenomenon in orbital drilling of titanium alloys (TiAl6V4) 42
14074 Study of tangential force exerted on rake face during high-speed end milling of Inconel 718 43

Session 11: Machine tool components/chairman: Prof. Jedrzejewski

14038 Dynamic modelling of an electro-hydraulic actuator to isolate machine tools from ground vibrations 44
14040 Damping in linear guides considering operational factors 45
14036 A new device for spindle accuracy inspection 46
14082 Study on vibration response of high-speed spindle with bearing defects 47

Session 12: Machining analysis & optimization/chairman: Prof. Jiang

14018 Velocity measurement of chips at the gun drilling process with an optical measurement systém 48
14022 Phenomenological investigations of heat sources and boundary conditions for metal cutting processes 49
14046 Prediction and compensation of process induced shape deviations in multi-axis high-speed hard finish milling 50

Session 13: Machine tool design/chairman: Dr. Kolář

14014 CNC data acquisition: system development and validation 51
14024 Integration of discontinuous milling operations into the flow production of sheet metal profiles 52
14070 Development of forced cooling using mist of strong alkaline water for restraining thermal deformation on a machine tool 53

Poster session

14015 Heat flux modeling during the machining operations of an explosive material – application to drilling 54
14025 Trajectories in laser machining ceramics: Thermal model to control material removal rate 55
14027 Monitoring of cutting process in end milling of hard and brittle materials 56
14030 Investigation on minimization of chatter vibration in thin-wall machining of Al7075-T651 57
14037 Time domain criteria for controller parameterization by simulation based optimization 58
14043 Analysis of machining configurations with ball-end mills in order to finish parts made by EBM and comparison with numerical model 59
14054 cBN-based cutting tools for high-speed cutting of hardened steel and cast iron grades 60
14055 Optimization of design, processing, and cutting performance diagnostics of the cutting inserts based on ceramic composite materials 61
14060 HiPIMS coated carbides with high adhesive strength for hard machining 62
14064 Real time chatter vibration control system in high speed milling 63
14068 Experimental study in plunge milling of damage-tolerant titanium alloy TC21 64
14088 Both-side drive of a ball screw feed axis – verification of the theoretical assumptions 65

INDEX 66
COMMITTEES OF HSM 2014 67